

POSITION

1. Project Title/ Job Position title:

Surveillance of Enterovirus and Parechovirus Infections in Hospitalized Neonates

2. Area of Knowledge: Life Sciences

3. Group of disciplines:

Human Biology, Microbiology, Molecular Biology, Genetics, Cellular Biology, Genomics and Proteomics, Biochemistry

4. Research project/ Research Group description

Neonatal enterovirus (EV) infections may lead to a severe sepsis-like disease including meningoencephalitis, myocarditis, pneumonia, hepatitis, and/or coagulopathy. Substantial mortality rates have been reported, and long-term sequelae may occur among survivors. Human parechoviruses (HPeV) belong to the same *Picornaviridae* family. Recently, HPeV and EV are causing outbreaks and a variety of neurological infections, morbidity and mortality. Exact incidence of neonatal EV/HPeV infections is unknown. Surveillance of these polio-like diseases is thus a public health concern. High pathogenicity in neonates could be associated with absence of maternal neutralizing antibody, specific serotype, different tissue tropism and immature immune system. However, pathologic mechanisms of these viruses are not well characterized.

The project's objectives are:

- To know the incidence of EV and HPeV by routine testing of hospitalized newborns with clinical suspicion of infection
- To define the clinical features and associated factors of neonatal EV/ HPeV infections
- To study the short-term and long-term outcomes of infants who suffered severe EV/HPeV infections, and were either treated or not treated with IVG
- To design NGS methods for whole genome sequencing of HPeV (HPeV-3 and others) in order to perform comprehensive phylogenetic and recombination analyses and to define the pathogenic and virulence determinants.
- To study the infection capacity and tropism of HPeV-3

This is a collaborative project that gathers the dynamics of two research groups: Neonatology and Pediatric Respiratory, Systemic and Neurologic Infections & Host Innume Response. The groups are focused in the study of pediatric infections with special attention to those associated to viruses. The project will be carried out at the La Paz University Hospital (patient recruitment and clinical follow-up) and at the Enterovirus Reference Laboratory of the Spanish National Centre for Microbiology (virological investigations).

5. Job position description

Role: Predoctoral student

Responsibilities

- General:

Collaborate with colleagues and participate in team activities (such as meetings, seminars, workshops, etc.) across the research group and wider community while keeping up to date with current knowledge and recent advances.

Keep updated the laboratory notebook and properly storage and manage the data produced during the project.

Maintain experimental resources (as cell lines, reactivities, etc.) according to protocols.

Undertake any other duties of equivalent standing as assigned to him/her.

- **At hospital:**

Patient recruitment: screening, enrolment and informed consent procedures.

Collection of biological samples, clinical and epidemiological data. Statistical analyses.

Patients' follow-up (IVG treated and non-treated infants).

Analysis of clinical factors associated with the host susceptibility.

- **At laboratory:**

Detection and characterization of the EV/HPeV infections in biological samples using molecular methods (PCR, sequencing)

Sequencing of whole genome of HPeV-3 strains detected (and other relevant HPeV types) by NGS methods.

Phylogenetic and recombination analysis of whole HPeV genomes.

In vitro HPeV-3 infectivity and replication assays in different cell lines (neurological, gastrointestinal, and pulmonary cells).

Obtaining of HPeV-3 infectious clone (reverse genetic technology). Identification of virulence and pathogenicity determinants.

Skills

Bio-science degree: medicine, biology, bio-technology, chemistry.

Experience in microbiological laboratory

Motivation, critical thinking and problem-solving oriented skills.

Good interpersonal skills, including team working.

Good communication skills, willingness to engage in public presentations and ability to transmit complex concepts in a clear way.

Good time and workload management skills, including both initiative and flexibility.

GROUP LEADER

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4. **Research Group website:** <http://www.idipaz.es/PaginaDinamica.aspx?IdPag=53&Lang=EN>

OTHER RELEVANT WEBSITES

www.rutip.org Translational Research Network in Pediatric Infectious Diseases (coordinated by the Group Leader).